GrummanWorld

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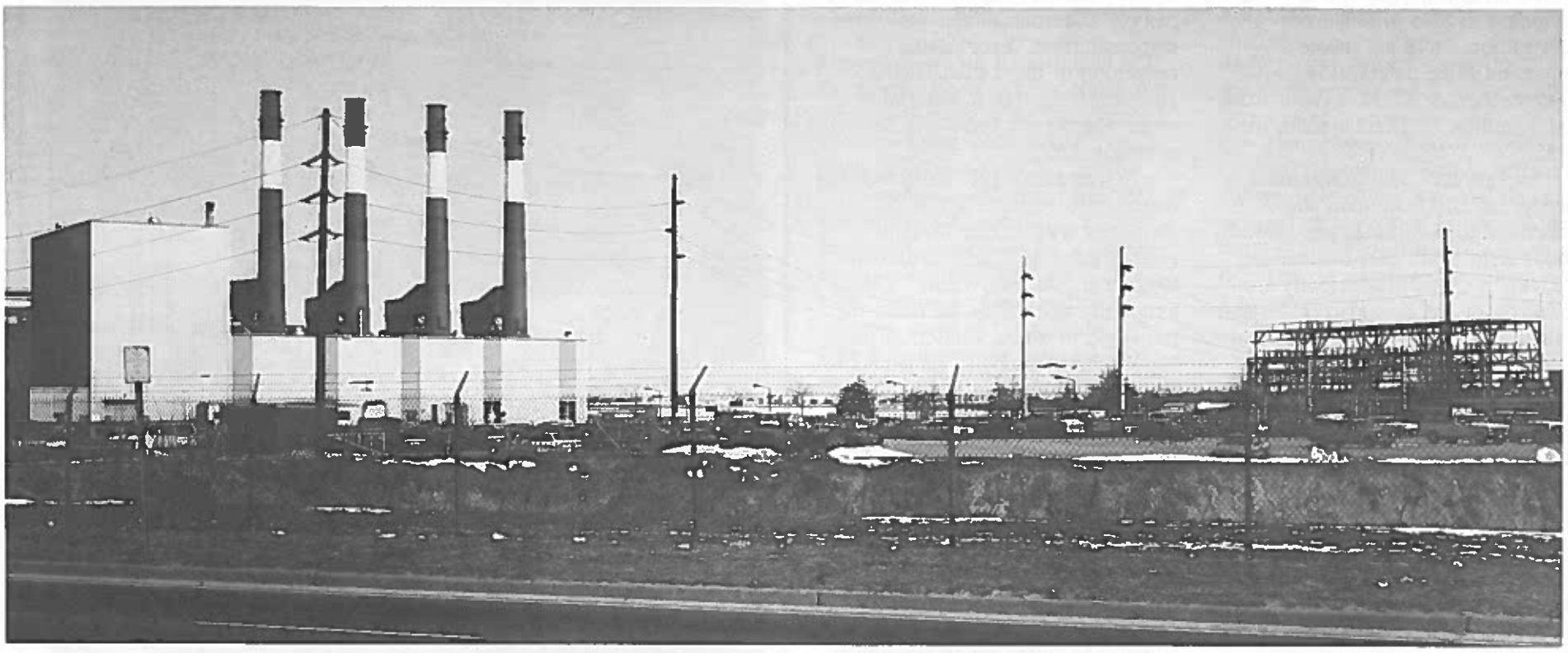

Powerful Property. *By mid-1989, this area of the Bethpage complex will be the site of a 50-megawatt power plant. The co-generation power plant will turn out enough electricity and steam to supply the entire Bethpage complex on Long Island. (Photo by Bob Settles)*

GE To Bring New Power Plant To Life At Grumman

In a few years, Grumman will take a load off its utility bill while bolstering the electric power supply of its Long Island neighbors.

General Electric has agreed to construct a generating plant in the Bethpage complex and sell electricity to Grumman at a negotiable discount rate — initially about 20 percent less than the commercial price of Long Island Lighting Company (LILCO) power. The plant will supply the electricity for the entire Bethpage complex. In addition, this natural gas-fired plant will produce steam, used for heating the complex and for various manufacturing and scientific needs.

GE plans to have the 50 megawatt plant on line in July, 1989. The project will be a team venture among GE's Turbine Division, Schenectady, New York; Brooklyn Union Gas Company; and TransCanada Pipeline. The cost is estimated to be $50 million. Grumman will use about 30 megawatts. GE will sell the remainder to LILCO. While Grumman will save $3 to $3.5 million a year, Long Island will benefit as well.

"This plan assures an adequate supply of electric power for our Bethpage operations at a reasonable cost," says Grumman Chairman Jack Bierwirth. "As a result, an additional 50 megawatts of power will be available for homes and businesses on Long Island."

According to Dean Cassell, Grumman vice president—Product Integrity and Environmental Protection, electric power needs on Long Island will tax the ability of LILCO to produce it over the coming years. "There is a bona fide energy crisis staring Long Island in the face," he says. "We expect brownouts this summer, worse ones in the summer of '88 and perhaps even power shortages in '89."

Last summer LILCO generated a peak of 3,400 megawatts, close to its total capacity. By taking Grumman's entire Bethpage complex out of its system and having about 20 additional megawatts available, the possibility of brownouts is drastically reduced.

Grumman has long been concerned with rising LILCO rates and their effect on the cost of doing business on Long Island. Rates could be pushed up if the cost of the Shoreham nuclear power plant must be borne by ratepayers. What's more, since 80 percent of LILCO's generators are oil-fired, they are critically dependent on the volatile price of oil in the world market.

Grumman had been looking into the possibility of building its own cogeneration plant for the past several years. No matter which way the company looked, however, the minuses always outweighed the pluses.

"It requires a huge capital investment to build and maintain your own generating plant," says Cassell. "At a time of limited funds, this just isn't something Grumman should invest in. It isn't our primary business."

"We decided to go back and revisit this thing. We asked ourselves, 'Should we do it at all? What about getting more power from the Fitzpatrick Plant and what about the Marcy line?' We decided to solicit industry," says Cassell. "Let them build and run a plant and provide the power to us."

Such a route minimizes Grumman's risk and guarantees savings. There is no capital needed because the operator finances the plant. Moreover, the job is in the hands of power plant professionals.

Grumman solicited 10 companies, evaluated their responses and selected four teams as finalists. They came together at a bidders' conference in December and submitted proposals. A small team of Grummanites from Environmental Protection, Legal, Business Operations, Paumanock Development and Facilities evaluated the proposals over the Christmas break.

Three teams submitted bids for gas turbine plants, and a fourth proposed a diesel system.

"Technically they were all pretty close," Cassell recalls. "GE offered us the best business proposition."

Grumman and General Electric signed an agreement on February 4. The final contract is now being negotiated. GE will sell electricity to Grumman at a 20 percent discount for 15 years. By New York State law, LILCO must buy the excess power produced by the plant.

If a problem develops and the plant cannot produce electricity, GE must pay the difference between its rate and what Grumman must pay to get electricity from LILCO in the interim.

The turbines will normally be fired by natural gas brought from Canada, though they can run on home heating oil in emergencies. The gas will travel through TransCanada's huge pipeline, which will serve the entire New York metropolitan area as well. LILCO must be paid for moving the natural gas through its own gas lines on Long Island.

The new generating plant will be built on a two-acre site next to the Building 5 steam plant in Bethpage. It will be slightly larger than the steam plant, which will be kept as a backup.

Grumman will lease the site to GE. The site will be separated from the rest of Grumman's property by a fence and will be operated and maintained solely by GE or its subcontractors' employees. Though Grumman has agreed to help GE obtain necessary building permits, Grumman will have no part in building or running the plant.

"This couldn't come at a more opportune time," says Cassell. "LILCO is scratching to add additional power capacity to its system. When this plant goes into operation, it will add 50 more megawatts of power to the electric power supply of Long Island."■

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Grumman Reports 1986 Operating Results

On February 9, 1987, Grumman Corporation reported that 1986 sales increased to $3.5 billion from $3.1 billion while net income decreased three percent to $78.7 million or $2.32 a share from $81.5 million or $2.65 a share in 1985.

In February 1986, Grumman issued 2,875,000 common shares which reduced earnings per share by about eight cents. Net income for the year decreased principally from lower profits on aerospace sales and a significant increase in interest costs.

For the fourth quarter, sales increased to $930.6 million from $831.9 million. Net income for the quarter was $24.8 million or 72 cents a share compared with $23.1 million or 76 cents a share in the 1985 fourth quarter. Quarterly net income increased seven percent while earnings per share decreased five percent due to the greater number of common shares outstanding.

Sales of the aerospace segment increased $160 million for the year. During 1986, sales from the F-14D and A-6F upgrade development contracts with the Navy increased about $158 million. Increases also resulted from the delivery of two additional EA-6B aircraft to the Navy and two additional E-2C aircraft for foreign delivery.

Aerospace operating profits declined $25.6 million for the year due primarily to lower overall contract prices, higher than expected manufacturing costs, particularly on the Navy's C-2A program, and the phase-out of the successful EF-111A program for the Air Force.

In the non-aerospace segments, profits increased by $25.8 million or 59 percent on a sales increase of $384 million or 54 percent for the year. The electronics systems segment accounted for $263 million of the sales increase and $7.7 million of the profit increase. Information and other services, which includes the company's data systems operations, contributed $93 million of the sales increase and $16.5 million of the profit increase. This included the $7.1 million gain on the sale of a subsidiary.

Interest expense increased $19.2 million as a result of increased borrowings in 1986. Company funded research and development costs amounted to $78.9 million, an $8.4 million increase from 1985.

As of year end, the company's funded backlog was $6.7 billion, up from $5.4 billion at the end of 1985.

The F-14D and A-6F development programs have been included in the 1986 results on a break-even basis. As previously reported, certain technical problems have been identified which could significantly affect program costs and schedules as well as the performance of these aircraft. These problems have been the subject of intense discussions between the Navy and Grumman to determine the best possible solutions and to resolve disagreements with respect to certain of the associated responsibilities. Pending the resolution of these matters, the company is unable to determine if or to what extent there will be any attendant loss.

"Grumman's 1987 sales will not match 1986 because our F-14 deliveries will decline to eight aircraft from 24," said Grumman Chairman Jack Bierwirth. "This is a temporary decline as we make the transition to a new version of the Navy fighter. In 1988, we expect to deliver 17 F-14s, and I am confident that we will deliver the first F-14D with its new electronics and engines on schedule in 1990.

"We are reducing our costs. We have made the painful decision to reduce our Long Island work force by 1,500 during the next few months. Our building and modernization program is nearing completion, after which we expect capital spending to decline. Still we anticipate net income to be down slightly for the year due to the revenue decline in the aerospace segment.

"However, our non-aerospace operations should continue the sales and earnings growth we had in 1986," said Bierwirth. "In addition to growth in the electronics and information segments, our Allied operations will deliver the first vehicles to the U.S. Postal Service under our $1.1 billion contract.

"Grumman operates in an increasingly competitive environment, but we have won the new programs and put in place the people and facilities to insure our future successes."■

Personals

I would like to thank my co-workers and friends for their kindness and support during my recent illness. Your cards, letters and prayers helped me make it through a very difficult time. **Lisa Parkman**

We wish to thank our co-workers, friends and ESO for their expressions of sympathy during the recent loss of my brother Al. **John Gross and Family**

My family and I wish to thank all of my fellow workers and ESO for their expressions of sympathy and support during the recent loss of my father. **Ron Smith**

My family and I wish to thank all my friends, fellow workers and ESO for their kind expressions of sympathy during the recent loss of my father. **Bill Eckler**

I would like to thank everyone in Building 9 for being so nice to me while I was in the hospital. It's great to have so many friends. **Rita O'Shea**

The family of Ralph Frei would like to thank his many co-workers and friends at Grumman for their kindness and support during our recent loss. Your cards, letters and prayers helped us make it through a very difficult time. **Lee, Nancy, and Doug Frei**

On behalf of my sister Julia and her husband, Navy Cdr. Robert Block, I wish to thank the many Grummanites who have expressed sorrow, sympathy, and support over the tragic deaths of their young daughters Mary and Aileen. I believe your thoughts have been of some help in these very difficult times. **Joe Dlhopolsky**

Into His Work. *Before this main junction box leaves Building 44 in Great River, Long Island, the Electronics Systems Division's Harness Department must install all the electrical subassemblies and most of the internal wiring. It takes about a month. Above, electrical assembler Bob Werkheiser gets a junction box ready to send to Bethpage for completion and installation into an E-2C. (Photo by Bob Settles)*

Next Lecture: March 2

Dr. Russell Messier of Penn State will give the next Leroy Grumman lecture on March 2. The topic: diamond coatings.

The lecture will be held in the Grumman Headquarters auditorium, concourse level, at 4:30 p.m.

Dr. Messier is a member of Penn State's Materials Research Staff and is on the faculty in its Department of Engineering Science and Mechanics.

Coating objects with thin films of synthetic diamond may one day have a huge impact in electronics, optics, machine tools, chemical processing, and military technology. Such coatings could improve a wide range of devices — from rocket engines to razor blades.

This is the third in a series of lectures to inform Grumman's scientists and engineers. The series is named in honor of company founder Leroy Grumman and aims to further his commitment to technical excellence.

All Grumanites are invited, but space is limited. To make a reservation, call Susan Boccasini at Ext. (111) 63396 or 53766 (516-346-3396 or 575-3766).

Good Eating Habits

March is National Nutrition Month.

This year's theme is "Good Nutrition: A Personal Choice." Literature is available in the Medical Department in corporate headquarters as well as in nurse's stations throughout the company.

As part of the month-long awareness program, Grumman Food Services plans to have a luncheon special on March 26 at all L.I. cafeterias and buffeterias. Brochures will also be distributed at that time.

For further information, call Grumman Medical Services, Ext. (111) 52101 or (516) 575-2101.

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Action! *The Grumman Long Life Vehicle will soon be a regular sight on the streets of America. It even starred in a U.S. Postal Service training film, recently produced in West Palm Beach, Florida. Test production of the new vehicle will begin soon in Montgomery, Pennsylvania. (Photo by Bob Settles)*

LLV Passes Crash Course

Long Life Vehicles are being wrecked and Grumman Allied couldn't be happier.

Prototypes of the LLV that Grumman is building for the U.S. Postal Service have passed a number of federal motor vehicle safety standards and Environmental Protection Agency tests, says Bill Dehner, the LLV program test manager. The first LLV pilot production vehicle is scheduled to roll off the new assembly line in Montgomery, Pennsylvania, in late March.

Two LLV test articles have been put through fuel system integrity and windshield retention and intrusion tests. They were hit directly in front, in front at a 30-degree angle and at the rear.

"Hitting them at 30 miles per hour does quite a job on them," says Dave White, a senior safety engineer at Grumman Olson, who's been serving as liaison between LLV and General Motors. GM builds the LLV's chassis. "The vehicle has come through the Postal Service requirements very well," he says.

The final hurdle in this round is the side barrier test. The LLV, outfitted with instruments, including an instrumented mannequin, is rammed by a collision sled moving at 20 miles per hour.

Soon, new tests will be run on the first pilot production vehicle.

The purpose of the crash tests is to prove the integrity of the fuel system in a collision. "We have not lost any fuel in the three previous tests," says Dehner.

Everybody Must File New W-4 Form In 1987

The new tax law requires that you submit a new W-4 form to Grumman before October 1, 1987.

If you do not file a new W-4 by the deadline, Grumman must withhold taxes from wages as if you are either single claiming one withholding allowance or married claiming two allowances — depending on whether you checked the "single" or "married" box on your most recent W-4 on file.

Although you must complete the new W-4 form before October 1, it is important that you complete it as soon as possible since you may be significantly affected by the new tax law. Your withholding — plus any estimated tax payments — should closely match your tax liability for the year. Failure to do so could create a situation where you would have a large tax bill, plus a penalty, at the end of the year.

The new 1987 W-4 form includes a worksheet which will help you determine the number of withholding allowances you should claim. The new forms are available at all Employee Services offices.

For more information, call the IRS Tax Forms/Publications toll-free number — 1-800-424-3676 — for free copies of the following booklets: "Tax Withholding and Estimated Tax" (Publication 505), "Highlights of 1986 Tax Changes (including the Tax Reform Act of 1986)" (Publication 553), and "Is My Withholding Correct?" (Publication 919).

New York Telephone To Build Phone Network For Long Island Sites

Grummanites on Long Island will be able to reach out and touch one another through a new telephone network being designed by New York Telephone.

Grumman and this subsidiary of the NYNEX Corporation reached an eight-year agreement for a 20,000 line, digital network for transmission of voice and data between most of Grumman's Long Island facilities. By January 1 of next year, the network will be fully operational.

"Although there are some one-time charges, the new network will give us a significant reduction in costs and a major upgrade to all our telecommunications systems," says Al Zoitke, Data Systems' director of Telecommunications. With New York Telephone's system, Grumman avoids the cost and risks of installing, operating and maintaining its own network.

"In addition, we'll be able to take advantage of new telecommunications technologies," says Zoitke. "One of the most important features is that Grumman will have the flexibility to move service between sites on Long Island without costly penalties."

This is critical because Grummanites regularly move between programs on Long Island. The new phone system will be able to keep up with these transfers. "No communications facilities will have to be physically moved," says Joe Gustafson, director of Market Planning for New York Telephone.

"The network's flexibility will help Grumman to implement employee shifts quickly and efficiently with no disruption in telecommunications service," he says.

Beyond that, the network will give Grumman telecommunications managers the flexibility to adjust to changes in call traffic patterns.

One of the tools they'll use is the network's call detail recording system, which can track phone calls more efficiently than Grumman's current system. "With all the information the recording system gives us, we can make cost-effective network changes, such as routing traffic by time of day," says Zoitke.

The call detail recording system will also give Grumman a better handle on the costly problem of phones being used for personal calls. "This system will help us minimize the unauthorized use of Grumman phones," says Zoitke.

To the individual Grummanite, the new network will bring automatic routing of calls, call forwarding, call waiting, speed dialing and conference call capabilities, and simplify access to the microwave network and tie lines. Telecommunications will be able to choose the class of service assigned to each telephone.

"It will also give us a standard dialing plan, which means we'll dial the same way to reach other sites," says Zoitke.

The network itself is a "virtual" network. That is, through software Grumman can isolate and manage its telephone transmissions through the New York Telephone facilities. In essence, Grumman gets a private network while utilizing public hardware.■

Beware Of Bogus Salesmen

Recently, there have been many attempts by unauthorized vendors to sell copier toners and office supplies. Generally their products cost three to five times more than what Grumman authorized suppliers charge.

If you get a phone call from these salesmen trying to sell you products, refer them to Purchasing, Ext. (111) 53630.

These salesmen are pushing products that can harm your copiers. When ordering supplies for copiers, send your request to Jim Maskulyak, mail stop B03-15.

Retirees

On behalf of our fellow workers, *Grumman World* salutes the following Grummanites for their contributions to the company and wishes them well in their retirement. Those who have recently retired are:

William M. Lenahan (40), George W. Doukas (55), William E. Voorhest (18), Harold B. Jagendorf (31), William Magnis (18), Louis A. D'Angiolillo (43), Kathleen J. McCaw (237), Stephen Bruno (7), John H. Asher (6), Leonard L. Smith (6), Walter G. Maus (6), Jack L. Schultz (25), Thomas A. Costa (121), Edward W. Fontz (56), Otto W. Patrasek (5), Robert W. Bailey (7), Mae Gill (106), Frank G. Farrell (351), Albert R. Mead (12), Cyrus F. Coons (3), William P. Newton (111), Frank Pita (2), John J. Cherry (77), Joseph W. LoGalbo (6), George A. Gillott (7), Albert Umbach (1), Frederick Bremen (2), John Teufel Jr. (5), Henry F. Kopczynski (3), Ralph E. Broomfield (1), Thomas L. Keller (35), George R. Cordes (6), Fred E. Matthews (77), Paul J. Franklin (77), George R. Vicik (7), Harry B. Scott (77), Allen H. Schammer (77), Benny Satcher (66), James T. Watkins (66), Michael D. Chirillo (7), James F. Barry (2), Dario Antonucci (39), John Caroll (2), Leonard Ambrosino (2), Douglas Fredericks (9), Alexander Klimar (43), Robert Nicholas (1), Charles Selltitz (25), Thomas A. Coughlin (111), Adam Kaczur (2), Gertrude Kayser (25), Joseph Reiter Jr. (4), Manuel Rodriguez (43), William Koch (15), Isadore Fried (43), Robert G. Miller (30), James J. Mackey (44), Walter T. Konig (24), Philip H. Zinsmeister (77), William M. Lenahan (40), Louis R. Ciavarelli (15), Emiko K. Burke (52), James J. Kiles Jr. (6), Robert C. Specht (6), Eleanor A. Provenzano (2), George J. Schultz (40), Harold E. Robinson (12), Gregory W. Knowles (119).

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Logs On To Computerized Manufacturing System

n engineering and production

operation has been pretty much separate from the others — as well as from the business and engineering computer systems. Now, we're closing the loop. We're just beginning, and there is still work to be done. But when it's all complete, the system will enable the shop to reduce flow cycles — the time it takes to produce a part, from start to finish — and improve efficiency."

The equipment required includes cables, terminals at strategic locations, and minicomputers ("cell controllers"). "We're just tying together existing pieces of equipment," DiFilippo points out.

The system will entail software. Just like the paperless office touted a decade ago, getting machines to "talk" to each other involves programming. But it'll be well worth the effort: a machine operator requires information from many sources — for instance, parts drawings, scheduling information, and methods and procedures. Without the link, data must be constantly re-entered into an endless variety of computers, to the detriment of modern equipment's time-saving benefits.

With up-to-the minute scheduling data, everyone knows exactly where and when material will be needed.

More important, Grumman will be able to minimize inventories. In industry, this is known as just-in-time manufacturing. Since switching from one job to another is easier, machine operators require less time to reset their equipment and become proficient at the new work. With up-to-the-minute scheduling data, everyone knows exactly where and when material will be needed, so there's no need to order extra. Eventually, Grumman will even invite suppliers to set up telephone data links.

Yet another benefit will be realized when engineering changes are made. Since inventories will be reduced, less material will be subject to rework or scrapping when a part design is changed. Grumman will more easily cope with reductions in progress payments — advance funding for a contract before it's completed. In reducing flow cycles, the system will improve Grumman's profit margin.

Raw materials enter the detail partsmaking center by way of the NC Profiling Cell. They bear metal tags with work order identifications. In the future, they'll have bar codes on them just like the universal product codes in supermarkets. Those bar codes will stay with the part until it leaves Building 3.

"When material comes in, an operator will read the information into the computer network with a wand," Bevelacqua notes. "Engineering, cost tracking, labor, quality criteria, tool and machine information can all be integrated this way. If there is ever a problem with the part, we will be able to track it back to the machine and even to the individual tool that was used."

The NC Profiling Cell has a quiet, efficient, squeaky-clean atmosphere. The Sunstrand Partsmaker makes parts from extruded material — three-dimensional shapes, commonly an "L" or a "U" shape. Nearby, the NC Router makes flat parts.

A direct link between this router and the Grumman Engineering/Manufacturing System has already been successfully tested; the permanent hookup will be established this spring, once work is finished on a new software program called the Grumman Automated Nesting System. Nesting groups parts of like materials and thicknesses on computerized templates, in such a way that little metal gets wasted. A less-sophisticated nesting program now creates the nests, with manual intervention involved. The new program will make the function automatic.

Bruce Frank used to operate a hand router. When he switched to the Sunstrand Partsmaker four years ago, he took a course covering, among other things, computer programming.

"Operating the Partsmaker today is definitely an improvement over the old method," says Frank. "It's not just a timesaver — hand routing is messy and can be dangerous. There's always the potential for defects. In addition, it has made the job much more interesting.

'You develop a sense of ownership by listening to people, by finding out how they go about their jobs.'

"Computer integrated manufacturing has really made setups even easier," he continues. "A lot of times, you have one- or two-piece runs. With CIM, the system takes care of grouping part runs, and downloads the machine data automatically. This cuts setup time and eliminates the need to create, store, and load tapes. I also don't have to review the scheduling data separately."

"In my opinion, CIM has the potential to become a great system that will handle just about any work we require," says Steve Parsloe, leadworker in the Profiling Cell. "But we're just now beginning."

Later, a second router and Partsmaker will join the network. The next cells in line are Forming and Heat Treat.

Later on, Finishing Operations will become part of the scheme. Holes were recently dug in the floor for support posts for Finishing's new work-conveyor system. Under review is a type of automated material handling system that would link the entire plant.

Finishing will remain at the east end of the plant, giving the operation a straight line production flow. From there, detail parts go off to subassembly areas, in Building 2 and elsewhere.

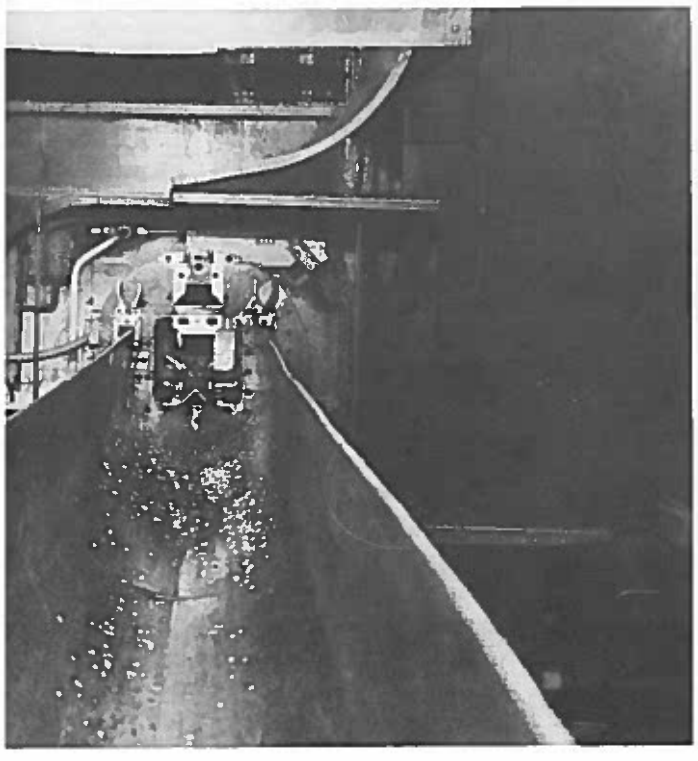
In many firms, computer people are isolated from the production floor. Neither group understands the needs of the other, systems are developed and installed hastily, resentment builds, and the project takes longer to get up to speed.

To guard against this, in the Profiling Cell the Data Systems people work alongside the Manufacturing people - and this practice will be copied on down the line. Even training is two-way: just as production people have learned some computer programming, programmers have learned rudiments of machine operation.

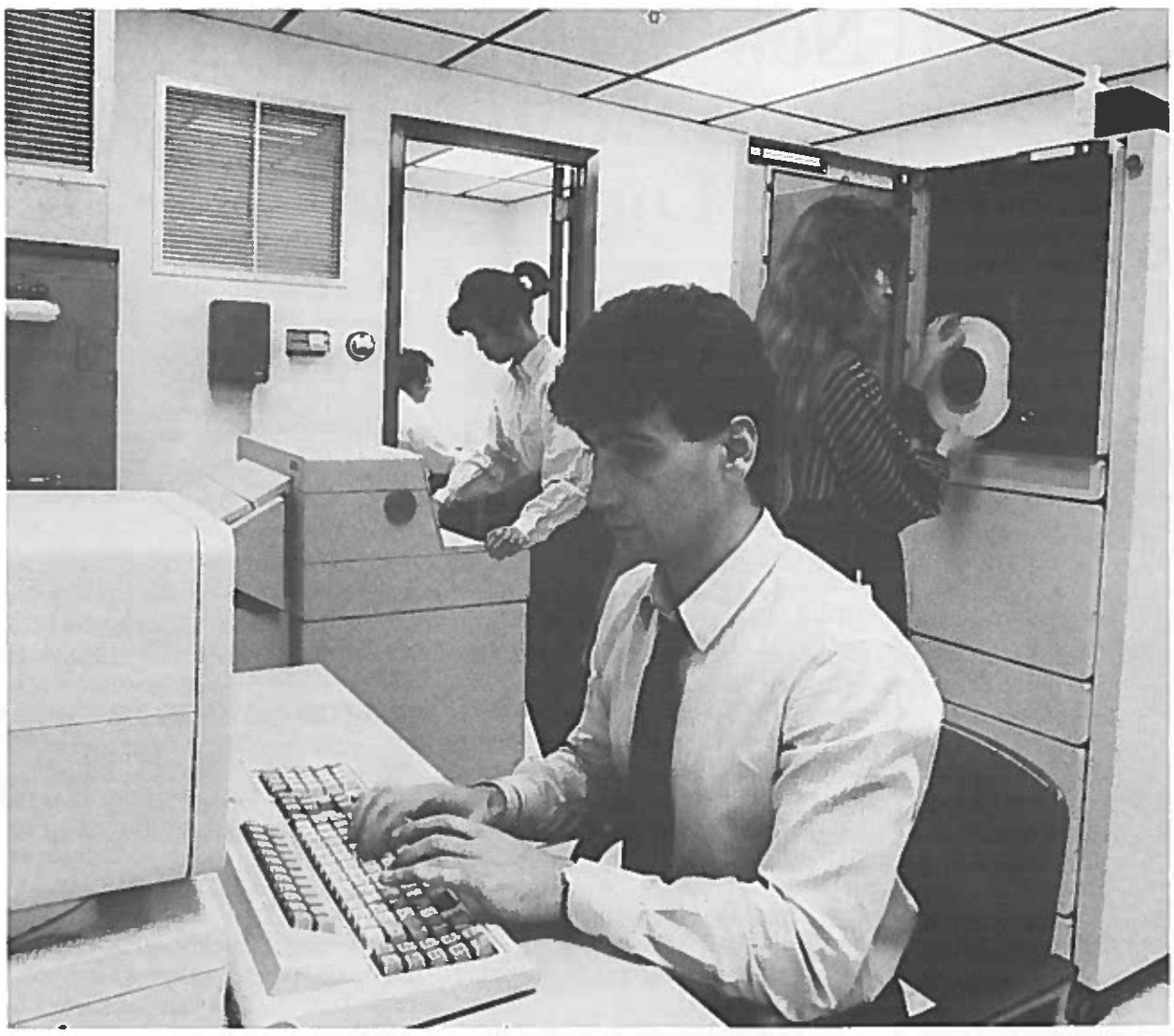
"Of course, the bottom line is that we have to use new equipment and systems — but everyone pays attention to our problems and makes any necessary adjustments," says Frank.

"The people in the NC Profiling Cell are used to it now," says Bevelacqua. "They're saying, "it's *our* system. The way you develop that sense of ownership is by listening to people, by finding out how they go about their jobs. People have got to be supportive. They're the ones who have to make it work.

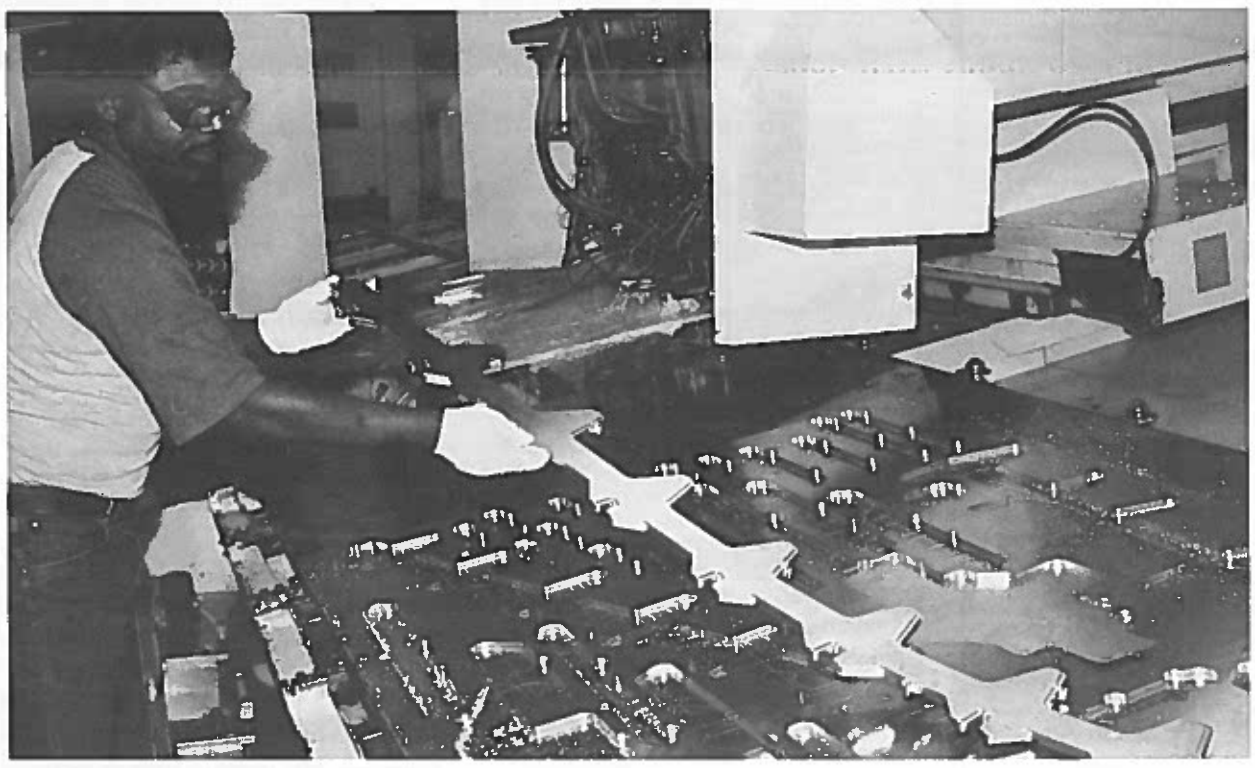
"Our computer integrated manufacturing project has universal application," adds Bevelacqua. "In Grumman's case it could work for electronics systems and postal vehicles as well as airframes. The concept works for any manufacturing company — providing an integrated management system from contract order and engineering design through manufacture and customer delivery. The key is to eliminate duplication of effort and make for the efficient flow of data through the corporation."■

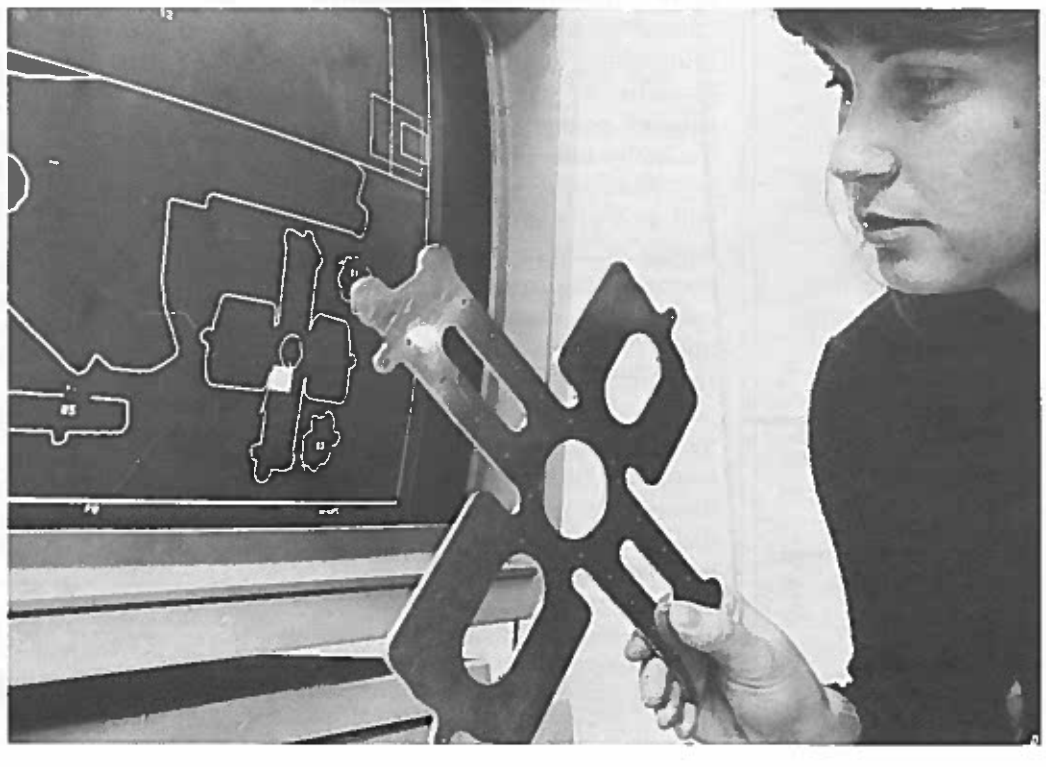


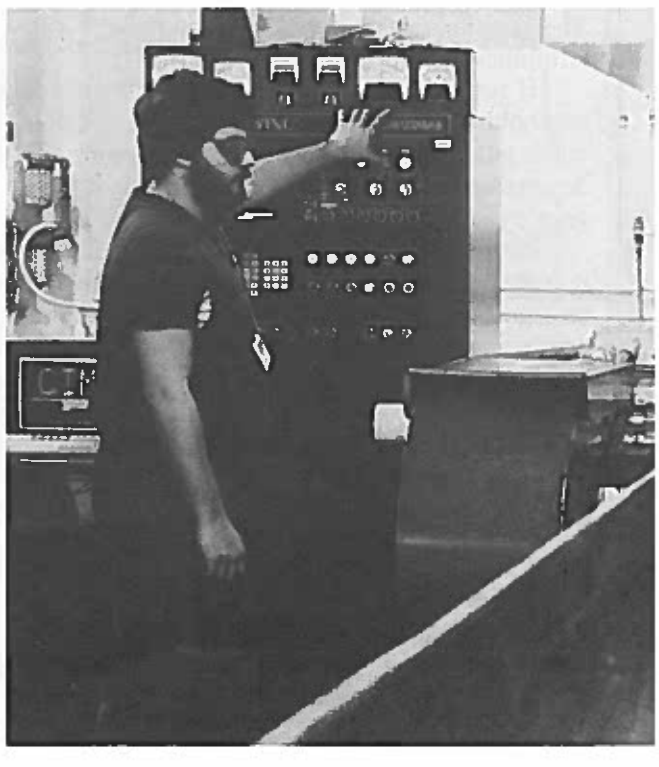
New And Improved. *At left, Bruce Frank makes an extruded part using the Sunstrand Partsmaker. The machine used to operate in a standalone fashion. Now, it's directly hooked up to the computerized system, which contains all the necessary data. Above, Hoi Yee Seto reviews a list of the parts that are now being produced through this closed-loop system.*



Nerve Center. *The computer integrated manufacturing system gets parts data directly from the system used by Grumman engineers to design aircraft. Above, Mike Marino (foreground), Randy Knaub (back room), Hoi Yee Seto (standing) and Linda Guercio work on software to accomplish this link. Below, Bob Williams operates the NC Router, which will soon be the second piece of equipment hooked up to the computerized network. At bottom, Guercio compares a completed detail part to its 'nest.' (Photos by Bob Settles and Jim Wagner)*







Detail Parts Cente

New network closes the loop bet

BETHPAGE, N.Y. — When people arrive at Building 3 each morning, green-and-white computer printouts tell them their work for the day. Everyone except Bruce Frank, that is.

Frank, who operates the Sunstrand Partsmaker in the NC Profiling Cell, doesn't need it: his four-year-old machine is the first of many in Grumman's detail-parts center to be hooked up to a computer integrated manufacturing (CIM) network. By the early 1990s, all the machines in Building 3 will be linked to this network. CIM will provide to all levels the key information needed to run the operation from a terminal.

A video display terminal on the side of the Sunstrand gives Frank a list of his day's assignments. But more important, the computer code telling it what to do comes directly from the Grumman corporate mainframes in Bethpage and Holtsville. This scientific and management information never leaves a computer — no output to paper, no tapes or diskettes.

But this system will save more than just office supplies.

Building 3 makes about 2.5 million individual aircraft parts — aluminum, steel, and titanium, and most of them two-by-two feet or smaller. It involves many steps and many machines: one might cut a scallop-shaped hole in one side of a part, while the next machine saws a 10-inch diagonal slot. Another bends the part into an "L." Maybe later on, it'll get heat treated. And so on.

Machine setups are frequent and time consuming, and the operation must be tightly controlled. Until now, that has meant lots and lots of paperwork.

"People usually think of manufacturing modernization as installing new equipment on the

'CIM will trim the behind-the-scenes activities necessary for making detail parts.'

shop floor, and retraining operators," says Mark DiFilippo, director of Manufacturing Systems for Grumman Aircraft Systems. "CIM will tie together these islands of automation. It aims to trim the behind-the-scenes activities necessary for making detail parts — paperwork, data entry, planning. They account for a large share of our costs."

"Computer numerical control equipment — in Building 3 and elsewhere — has already cut the time spent on job setups," notes Phil Bevelacqua, CIM project engineer. "But each

Delays Plague Grumman/Travelers Health Program

Last year, Travelers processed nearly 230,000 medical reimbursement checks worth approximately $60 million for the 40,000 Grumman employees, retirees and dependents covered under the Grumman/Travelers group health insurance plan.

Since the beginning of this year, Grumman employees and retirees have experienced annoying delays in reimbursements, along with busy telephone lines.

"There has been an unusually high volume of claims, questions, requests, and complaints," says Mary Kay Cronin, manager of Insurance Benefits. "We recognize the inconvenience this may have caused some people."

Cronin cites several reasons for the delays. Travelers has had trouble keeping track of participants' current employment status, mainly due to problems within Grumman's own records of interdivisional transfers. Complications have arisen from a recent effort to update the recordkeeping system at Travelers' East Meadow processing center on Long Island. Plus, there is the usual increase in the volume of claims submitted at the beginning of a new year.

Delays are expected to continue for a few more months. To help cope with these delays, suggestions are provided in the accompanying sidebar on this page.

Whether you are an active employee or a retiree, the first time in a calendar year you or a covered dependent incurs a medical expense, you must submit Travelers' *First Notice of Claim Form*. These forms are available in all Employee Services offices.

This blue form triggers your coverage for the new year. Additional *First Notice of Claim Forms* are required only for claims resulting from accidental injury. Do not submit a claim form until you satisfy your deductible amount ($250).

When submitting your claim form, make sure that medical bills and prescriptions submitted for reimbursement include your name and/or your dependent's name, and your social security number.

Provider bills (such as hospital, doctor or lab bills) should have the name and address of the provider, dates of service, descriptions of all services rendered, itemized charges for each service and the diagnosis. Prescriptions should include the prescription number and diagnosis. Remember that cancelled checks and balance due statements are not acceptable for reimbursement.

It is always a good idea to make copies of your claim forms and bills for further reference.

The Insurance Office recommends that Grummanites discourage their medical providers from submitting claims directly to Travelers. Your claim reimbursement can easily be delayed by leaving out important information such as your Social Security number.

Active Grummanites can mail their claims to: The Travelers, 90 Merrick Avenue, East Meadow, N.Y. 11554, Attention: Grumman Claims. Interplant mailing envelopes are also available in all Employee Services offices.

Grumman retirees can mail their forms directly to Travelers at the above address. They should also write - Attention: Grumman Retiree Claims — on the envelope.■

In Search Of Help

If you submitted a claim more than two months ago and have not heard from Travelers, send this form to: Gloria Lindergren, Insurance Office, C14-GHQ.

Name .....
Social Security Number .....
Badge Number Or Retiree Number .....

Date claim was submitted .....
Name of patient .....
*Provider(s) name .....
*Total charges submitted .....
*If you have copies of the bills, please attach

Your number: day .....
evening (after 4 p.m) .....

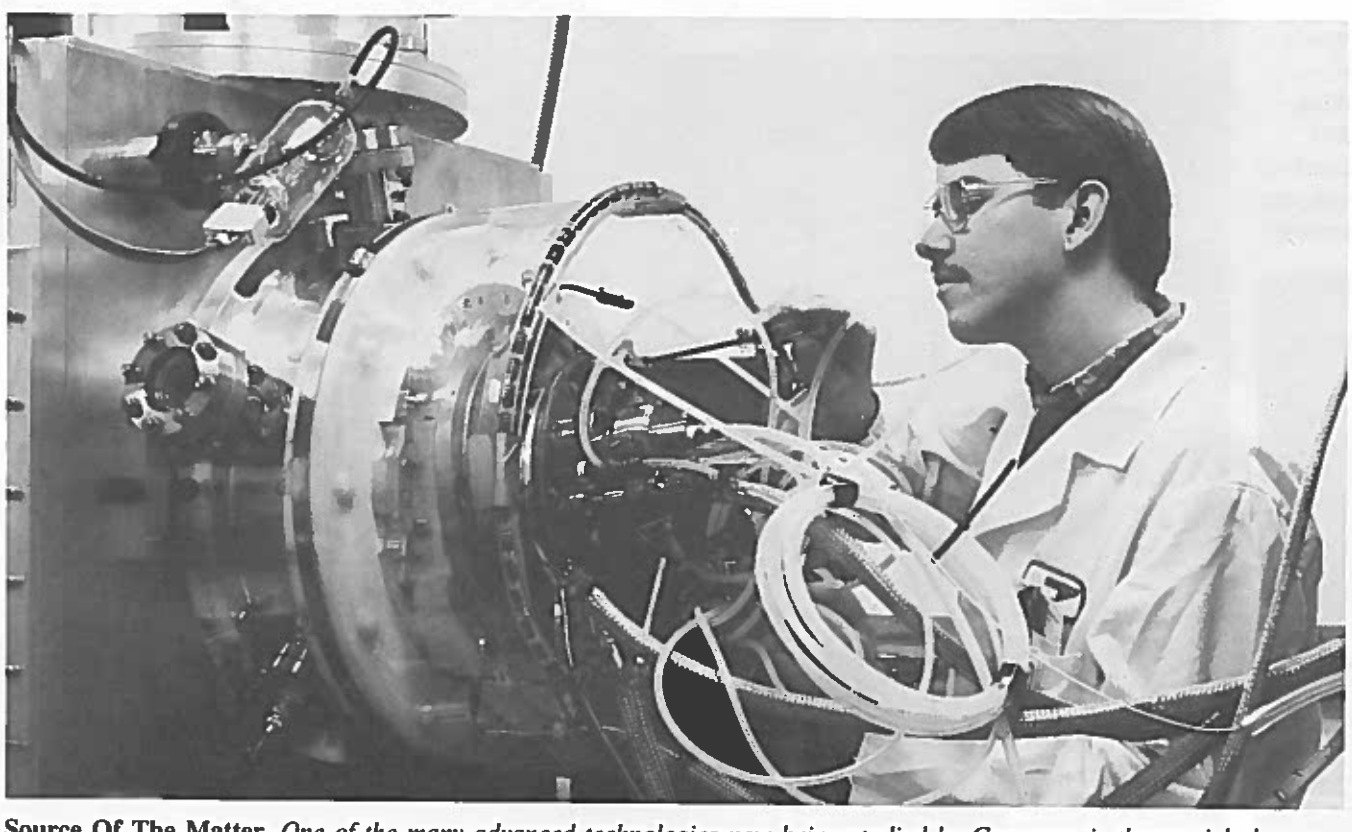
Mail to Gloria Lindergren, C14-GHQ

Who's Affected?

Those who elected to take the Grumman/Travelers Group Health Insurance in 1987 will be affected by delays if they work in the following divisions: Grumman Corporation, Allied, Data Systems, Corporate Services, Aerostructures, Aircraft Systems, Electronics Systems, Space Systems, and Melbourne Systems.

Tachonics and Grumman Technical Services are not affected even though these units are covered by Grumman/Travelers. That includes the Aircraft Services and Field Operations groups.

Other Grumman divisions and operating units are covered by different health plan administrators and are not affected.



Source Of The Matter. *One of the many advanced technologies now being studied by Grumman is the particle beam generator. In Building 26, Bethpage, technician Tim Brooks works on an ion source that generates such a beam. Grumman engineers designed the unit with the mass of tubing — the ion source — and the aluminum ring, called the post accelerator. The accelerator is connected to the Low Energy Beam Transport — the aluminum box at left. Though particle beam research is not new to Grumman, researchers have been at work on this particular unit for only about a year. (Photo by Jim Wagner)*

Coping With Delays

It normally should take four to six weeks to process a Grumman/Travelers claim, but most people are experiencing much longer delays. Here are some suggestions:

Talking To Travelers

- Only call Travelers if your claim was submitted six weeks ago or longer.
- The office is open from 8 a.m. to 4 p.m. (EST) weekdays.
- In New York State, call 516-296-2800; out of state, call 1-800-296-2800.
- Be sure to have your claims information ready for reference.
- Tell the Travelers representative that you are a Grumman employee/retiree and give your name and social security number.
- Ask for the name of the representative who is helping you and note it in your records.

Calling Grumman Insurance

- This office in corporate headquarters is open from 8 a.m. to 4:30 p.m. (EST) weekdays.
- Grumman employees can call Ext. (111) 53044/53146 or (516) 575-3044/3146. Retirees should call (516) 575-8000 in New York State. Grumman retirees who live outside of New York can call toll free, 1-800-645-7163.
- Only call this office if you cannot resolve your claim problems with Travelers. This Grumman office does not have access to claims information, but it will try to resolve your problems with Travelers. (Fill out the accompanying form on this page for assistance)

To Get Forms

Supplies of insurance forms have recently been replenished at all Employee Services offices. If you do not have an ESO in your facility, contact your plant manager's/administrator's office. They can write to Karen Kienast, C14-GHQ for forms. Retirees should write to Diane Bryers, C14-GHQ, Grumman Corporation, 1111 Stewart Avenue, N.Y. 11714.

R. Bailey

A. J. Beck

T. B. Carasiti

M. A. Ceraso

C. A. Engel

W. J. Everett

J. M. Fiola

D. L. Garrett

A. Gehrlein Jr.

K. F. Gustafson Jr.

H. A. Guzman

A. W. Hill

H. C. Isaacs

J. F. Johnston

L. Kipnis

P. A. Koenig

Service Milestones

45

Franklin C. Hardenburgh, Struct. Des., Bethpage, Aircraft Systems
Herbert C. Hedges, Veh. Liaison, Bethpage, Aircraft Systems
Walter Mashkow, Stockrooms, Bethpage, Aircraft Systems
Ernest J. Pennino, Prod. Mgmt., Calverton, Aircraft Systems

40

Frank T. Agiesta, Prod. Ops. Mgmt., Bethpage, Aircraft Systems
Thomas F. Caputo, Prod. Cont.—Maj. Assembly, Bethpage, Aircraft Systems
Edward J. Cavagnaro Jr., Tech. Pers. Svc., Melville, Aircraft Systems
George R. Cordes, Instr. Test, Calverton, Aircraft Systems
John A. DeJana, Elect. Test, Bethpage, Aircraft Systems
Frank Jackalone, Rec./Shipping Insp., Calverton, Aircraft Systems
Paul Wiedenhaefer, Adv. Aircraft, Bethpage, Aircraft Systems

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Alexander Cappeller, Mech. Insp., Bethpage, Aircraft Systems
Frank J. Csecs, Corp. Qual. Mgmt., Bethpage, Aircraft Systems
Arthur I. Darcy, SAL Matl. Mgmt., Great River, Electronics Systems
Stephen L. Dorniak, Elect. Fab., Bethpage, Aircraft Systems
David Fendel, Stockrooms, Bethpage, Aircraft Systems
Andrew H. Gelderman, Corp. Qual. Mgmt., Bethpage, Aircraft Systems
Henry F. Hauser, Mfg. Eng. Mgmt., Bethpage, Aircraft Systems
Patsy Lamberti, Mech. Insp., Bethpage, Aircraft Systems
Donald F. Lang, Qual Mgmt., Bethpage, Aircraft Systems
Peter Manganiello, Assemblies, Bethpage, Aircraft Systems
Anthony J. Mazzella, Sub-Assembly, Bethpage, Aircraft Systems
William L. Pagels, Metal Treat—Finish/Sealnt, Bethpage, Aircraft Systems
Dominick N. Pette, Prod. Cont.- Parts Cont., Bethpage, Aircraft Systems
Edwin H. Reid, Flt. Ops., Calverton, Aircraft Systems
Anthony L. Rollero, Router & Shear, Bethpage, Aircraft Systems
Thomas G. Schindler, Proj. Mgmt., Bethpage, Aircraft Systems
Stanley L. Seaman Jr., ILS Tech. Serv., Melville, Aircraft Systems
Clifford Seifried, Center Sect. Final, Bethpage, Aircraft Systems
William Williams, Maint. Admin., Bethpage, Services
James E. Winding, Bus. Ops. Mgmt., Bethpage, Services

30

Vincent Annunziata, Wing Final Assembly, Bethpage, Aircraft Systems
Henry J. Appel Jr., Electro-Mech. Lines, Melville, Aircraft Systems

R. L. Kosson

B. T. McCarey

E. J. Minden

F. P. Noonan

A. F. Novak

J. C. Pipczynski

John H. Barnett Jr., Flt. Ops. Insp., Calverton, Aircraft Systems
Lawrence Beck, Fuse. Fwd. Sub & Maj., Bethpage, Aircraft Systems
Joseph L. Beine Jr., Prod. Plt. Mgmt., Bethpage, Aircraft Systems
Mark F. Borrelli, Test Ops., Bethpage, Aircraft Systems
Charles B. Cannon, Electronic Test, Bethpage, Aircraft Systems
John J. Connelly, Avionics Des. Mgmt., Bethpage, Aircraft Systems
Robert Craig, Wing Final Assembly, Bethpage, Aircraft Systems
Ramon DeAquino, Prog. PC&B, Bethpage, Services
Silvio Derespinis, Des. Eng., Bethpage, Space
John E. Derrico, Conf. Data., Melville, Aerostructures
George DiTullio, Software Sys. Mgmt., Melville, Aircraft Systems
John Disalvo, Product Plan., Bethpage, Aircraft Systems
Giacomo Esposito, Assemblies, Bethpage, Aircraft Systems
Carl P. Fagioli, Matl. Shortage Cont., Bethpage, Aircraft Systems
Bernard A. Flanagan, Matl. Stor. & Dist., Calverton, Aircraft Systems
Robert W. Fritz, N.C. Router, Bethpage, Aircraft Systems
Elie J. Gendron Jr., Matl. Offsite Supt., Bethpage, Aircraft Systems
Alfred Giardina, Sub-Assembly, Bethpage, Aircraft Systems
Charles Giardino Jr., Pres. Svcs, Bethpage, Services
Joseph Grusauskas, Tech. Ops., Stuart, Aircraft Systems
Louis Hahn, Templates, Bethpage, Aircraft Systems
Arthur R. Halk Jr., Production, San Diego, Aircraft Systems
Richard Hawkins, Inv. Rel. & Cont., Bethpage, Aircraft Systems
Frank E. Helm, Qual. Lab., Bethpage, Aircraft Systems
Chester M. Houseknecht, Cent. Shortage & Retrieval, Bethpage, Aircraft Systems
George Katz, Veh. Liaison, Bethpage, Aircraft Systems
Craig H. Langwost, Proposal Mgmt., Bethpage, Services
David M. Layton, Mech. Process Eng., Bethpage, Aircraft Systems
Henry K. Liebergall, Cent. Shortage & Retrieval, Bethpage, Aircraft Systems
James M. Litterello, Estimating, Melbourne, Melbourne Systems
Arthur Lorelli Jr., Qual. Mgmt., Bethpage, Aircraft Systems
Frank Marinaro, Mach. Oper.—Parts Cont., Bethpage, Aircraft Systems
John J. Mariscalo, Trans. Ops., Bethpage, Services
Jerome P. Matthews, Mech. Insp., Bethpage, Aircraft Systems
Raymond J. Mayerle, Conf. Data. Mgmt., Melville, Aircraft Systems
Raymond F. McCormick, Prog. Mgmt., Stuart, Aircraft Systems
Edward Peck, Final Assembly, Bethpage, Aircraft Systems
Joseph Ruggiano, Prototype, Bethpage, Aircraft Systems

R. B. Sablynski

R. C. Thall

F. J. Wenke

F. T. White

Louis A. Sales, Prog. Mgmt., Great River, Electronics Systems
Albert Schrage Jr., Sulfuric Acid Anodize, Calverton, Aircraft Systems
John G. Schreiber, Estimating, Bohemia, Electronics Systems
Mathias A. Speidel, Eng. Ops., Bethpage, Aircraft Systems
Alfred R. Steuart, Elect. Wire Prep., Great River, Electronics Systems
James R. Stirling, Equip. Des. Eng., Bethpage, Services
James P. Strassburger, Source Insp./Test, Los Angeles, Aircraft Systems
James Strup, Tech. Reqmts., Melville, Aircraft Systems
Walter R. Stubbe, Conf. Data. Mgmt., Bethpage, Aircraft Systems
John J. Toner, Structures, Calverton, Aircraft Systems
Joseph Ulmer, Maint., Bethpage, Services
Laurence VanWallendael, Pres. Svcs.- Photo Lab., Bethpage, Services
Anthony Viorritto, Upholstery, Bethpage, Aircraft Systems
Frederick A. Wagenhauser, Gen. Commodities, Bethpage, Services
Charles R. Walthers, Eng. Test Ops., Los Alamos, Space Systems
William Wypyski, Matl. Mgmt., Bethpage, Aircraft Systems
Gordon F. Zaino, Trans. Office, Bethpage, Aircraft Systems
Joseph Zielinski, Assemblies, Bethpage, Aircraft Systems
Robert O. Zupp, Propulsion Sys., Melville, Aircraft Systems

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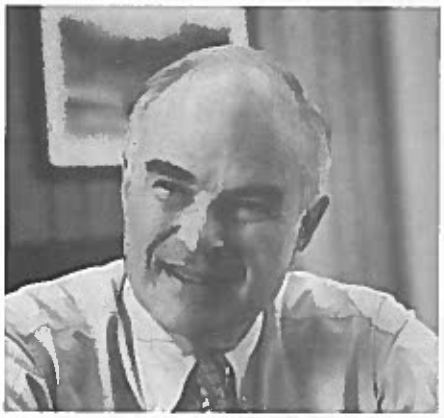
Rose Bailey, Mail & Teletype, Bethpage, Services
James C. Bartels, Fld. Ops., San Diego, Technical Services
Albert J. Beck, Flt. Crew, Calverton, Aircraft Systems
Clyde W. Cain Jr., Fld. Ops. Logis., VA Beach, Aircraft Systems
Thomas B. Carasiti, Mfg. Prog. Mgmt., Bethpage, Aircraft Systems
Michael A. Ceraso, Recreation, Bethpage, Services
John J. DePaoli, Food Svcs., Bethpage, Services
Richard DiRocco, Network Cont., Bethpage, Data Systems
Cuno A. Engel, Prod. Training Mgmt., Bethpage, Aircraft Systems
William J. Everett, ILS Pubs. Mgmt., Bethpage, Aircraft Systems
James M. Fiola, Proc. Svcs., Bethpage, Services
Donald L. Garrett, Corp. Instr. Ops. & Proj., Calverton, Aircraft Systems
Alfons Gehrlein Jr., ILS Elect. Pkg., Calverton, Aircraft Systems
Karl F. Gustafson Jr., Prod. Training Mgmt., Bethpage, Aircraft Systems
Hector A. Guzman, Test Ops., Calverton, Aircraft Systems
Arthur W. Hill, Matl. Mgmt., Stuart, Aircraft Systems
Thomas A. Hill, Prod. Cont., Great River, Electronics Systems
Howard C. Isaacs, Computer Equip., Bethpage, Aircraft Systems
John F. Johnston, Matl. Review, Bethpage, Aircraft Systems
Lawrence Kipnis, Avionics Des. Proj. Mgmt., Bethpage, Aircraft Systems
Priscilla A. Koenig, Qual./Safety, Bethpage, Space Systems
Robert L. Kosson, Fl. Science Mgmt., Bethpage, Aircraft Systems
Edward Mackay, Grumman Olson, Sturgis, Allied
Bernard T. McCarey, Bldg. 2 Subs., Bethpage, Aircraft Systems
Edward J. Minden, Elect. Fab., Calverton, Aircraft Systems
Francis P. Noonan, Matl. & Logistics Mgmt., Calverton, Aircraft Systems
Andrew F. Novak, Electronic/Elect. Supt., Calverton, Aircraft Systems
Joseph C. Pipczynski, Support, Calverton, Aircraft Systems
John J. Ptacek, ILS Ops. Supt., Melville, Aircraft Systems
Raymond B. Sablynski, Supt. Equip. Prod., Melville, Aircraft Systems
Francis T. Schultz, Tech. Pers. Svc., Melville, Aircraft Systems
Walter R. Sweeney, Eng. Software Sys., Holtsville, Data Systems
Richard C. Thall, ILS Equip. Des. Eng., Melville, Aircraft Systems
Frank J. Wenke, ATS Ops S&P, Calverton, Data Systems
Frederick T. White, RF Equip. Prod. Supt., Calverton, Aircraft Systems

For the latest Employee Investment Plan unit values, call 516-575-4400 for a recorded message.

A Letter from the Chairman



The new power generating plant that we're having built is good news: not just for our Bethpage complex, but for the rest of Long Island and for all Grumman facilities as well.

The three-company team we have selected will construct, own and operate the plant on land we will lease to them. Our investment and risk will be virtually zero. The plant will provide us about 30 megawatts of power — all we need for the Bethpage complex — at substantially discounted rates; another 20 megawatts will be available to Long Island Lighting (LILCO). It will save Grumman about $3.5 million a year in energy costs, and that is money we can put to better use.

Grumman is the largest private customer in LILCO's precariously overburdened system. Removing Grumman from that system, along with the the extra 20 megawatts the new plant can sell back to LILCO, makes another 50 megawatts available to homes and businesses on the Island. This reduces the threat of brownouts and power shortages for the rest of the community. LILCO has been helpful and cooperative with all of our planning for this new facility.

The new plant will help solve Grumman's energy problems on Long Island, and bring our costs a bit closer to those paid by our competitors. But, unfortunately, it doesn't solve the whole problem. Our costs also reflect what we must pay people to maintain their standard of living — and part of a Grumman paycheck goes to pay electric bills that are 73 percent higher than the national average. Our subcontractors and their employees are paying those bills, too.

The high cost of doing business on Long Island is the major reason we have placed most of our recent expansion in other locations around the country.

We have taken difficult steps to reduce our costs. We have frozen all hiring, and we are matching our Long Island employment levels to our production needs. We have reduced capital investment to the level necessary to sustain our business commitments, and reduced our operating budgets across the board. For the first time in 15 years, we will not be represented at the Paris Air Show. These measures are necessary if we are to successfully complete the new work we have taken on, and compete for the programs that will insure our future.

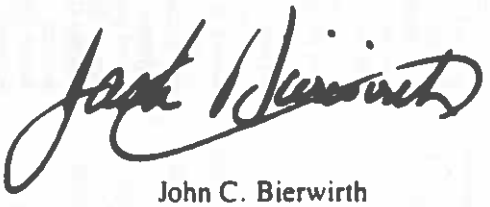
We are still in a growth phase. It seems that every time we think we're coming to the conclusion of a cycle of growth, another one starts.

A few years ago, we were hoping to win the F-14D/A-6F development contract. Then we were waiting to hear about IFTE, the contract for the Army's Intermediate Forward Test Equipment; then Joint STARS, and the Long Life Vehicle for the U.S. Postal Service. And, of course, we have won all those contracts.

But just as we settle into those projects, a whole new surge is forming. The Space Station Program Support Contract is for systems engineering and integration, coordinating all phases of space station development. This is an important opportunity, and we'll bid aggressively for it. The Navy wants to buy 24 new aircraft to replace its aging EA-3 electronic reconnaissance planes. We are building 39 C-2 Greyhounds under a reprocurement contract, and we will propose a modification of that plane for the electronic reconnaissance role. Lockheed's S-3 antisubmarine warfare aircraft looks like the only competition, and the S-3 production line has been closed since 1979.

In addition, a small contract from the government of Pakistan could lead to a much larger award. We are proposing a plan to redesign the nose section of an existing aircraft and install a new engine and avionics. This would be a cost-effective way for Pakistan to replace some of the aircraft already in its inventory.

There is no shortage of opportunities — but if we're going to be ready to take advantage of them, we must use our resources wisely. Our new power plant is a step in that direction: it's a creative approach to a problem, and an example of the kind of thinking that will pull us through some difficult times.



John C. Bierwirth
Chairman

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Bethpage, N.Y. 11714

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GrummanWorld
February 27, 1987

(Photo by Bob Settles)

Showing A Robot The Ropes

The Grumman Electronics Systems Division is studying the application of this "pick and place" robot for printed circuit board manufacturing.

In the surface mount technology lab in Great River, Long Island, manufacturing engineer Bill Andrisani uses a hand-held controller to program the robot. It will eventually be used for two circuit board assembly jobs at Great River, which will involve surface mount technology.

Most printed circuit boards have holes to insert the wire leads of transistors, integrated circuit chips and other components. Once inserted, the leads are bent and soldered.

With surface mount technology, the components are bonded to the top of the board. This method eliminates the need for holes on the boards and long leads on the components. Bonding is done by adhesives or a solder that's silkscreened onto the board just before the components are mounted.

The circuit boards produced by surface mount technology are smaller, more easily made, and less expensive than those made the traditional way.